

## **REMARKS**

### **The Amendments**

Claims 1 and 9 are amended to clarify the definition of the R<sup>3</sup> acid labile group in view of the newly cited prior art. Claims 5 and 13 are amended to correspond to these claim amendments and to make the obvious correction to address the 35 U.S.C. § 112 rejection.

It is submitted that the above amendments would put the application in condition for allowance or materially reduce or simplify the issues for appeal. The amendments do not raise new issues or present new matter and do not present additional claims. The amendments have been made to address the new grounds of rejection made for the first time in the Final Office Action and, thus, could not have been earlier presented. Accordingly, it is submitted that the requested amendments should be entered.

To the extent that the amendments avoid the prior art or for other reasons related to patentability, competitors are warned that the amendments are not intended to and do not limit the scope of equivalents which may be asserted on subject matter outside the literal scope of any patented claims but not anticipated or rendered obvious by the prior art or otherwise unpatentable to applicants. Applicants reserve the right to file one or more continuing and/or divisional applications directed to any subject matter disclosed in the application which has been canceled by any of the above amendments.

### **The Rejection under 35 U.S.C. § 112**

The rejection of claims 5 and 13 under 35 U.S.C. § 112, second paragraph, is believed to be rendered moot by the above amendments.

**The Rejection under 35 U.S.C. § 102 and 35 U.S.C. § 103**

The rejection of claims 1, 2, 4, 5, 7 and 8 under 35 U.S.C. § 102(e) over Choi (U.S. Patent No. 6,284,438) and the rejections of claims 3, 9-13, 15 and 16 under 35 U.S.C. § 103, as being obvious over Choi in view of Houlihan (U.S. Patent No. 5,843,624) are respectfully traversed.

The instant claims now recite that the polymer of formula (1) in the claimed resist compositions has at least one phenyl side chain group (i.e., q is not zero) with an -OR<sup>3</sup> acid labile group where R<sup>3</sup> is of the recited formula (3).

None of the polymers of Choi include such an acid labile-containing group; not in the polymers of Example 9 nor in any of the groups generally mentioned, for example, at col. 5, lines 39-40. Thus, the rejection under 35 U.S.C. § 102 should be withdrawn.

Further, there is no suggestion in Choi to modify their polymers to provide a polymer having a phenyl side chain with an acid labile group as recited in the instant claims. Choi specifically identifies the type of acid labile groups contemplated for its invention. Choi provides no suggestion that other acid labile groups would be useful for its invention.

The combination of Houlihan with Choi also does not suggest the claimed invention.

Houlihan was cited for its teachings regarding using a dissolution regulator in resist compositions. However, the inclusion of a dissolution regulator in the Choi compositions would still not result in or suggest a composition according to the instant claims. The polymers would still not contain a polymer having a phenyl side chain with an acid labile group R<sup>3</sup> as recited in the instant claims.

Houlihan was also cited for its teaching of acid labile groups at col. 5, lines 8-10, particularly 1-methylcyclohexyl. But neither 1-methylcyclohexyl nor any of the other acid


labile groups mentioned by Houlihan teach or suggest a polymer having a phenyl side chain with an acid labile group R<sup>3</sup> as recited in the instant claims.

For the above reasons, it is urged that the combined teachings of Choi and Houlihan fail to render the claimed invention obvious to one of ordinary skill in the art. Thus, the rejection under 35 U.S.C. § 103 should be withdrawn.

It is submitted that the application is in condition for allowance. But the Examiner is kindly invited to contact the undersigned to discuss any unresolved matters.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,

  
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Attorney Docket No.: KOJIM-383

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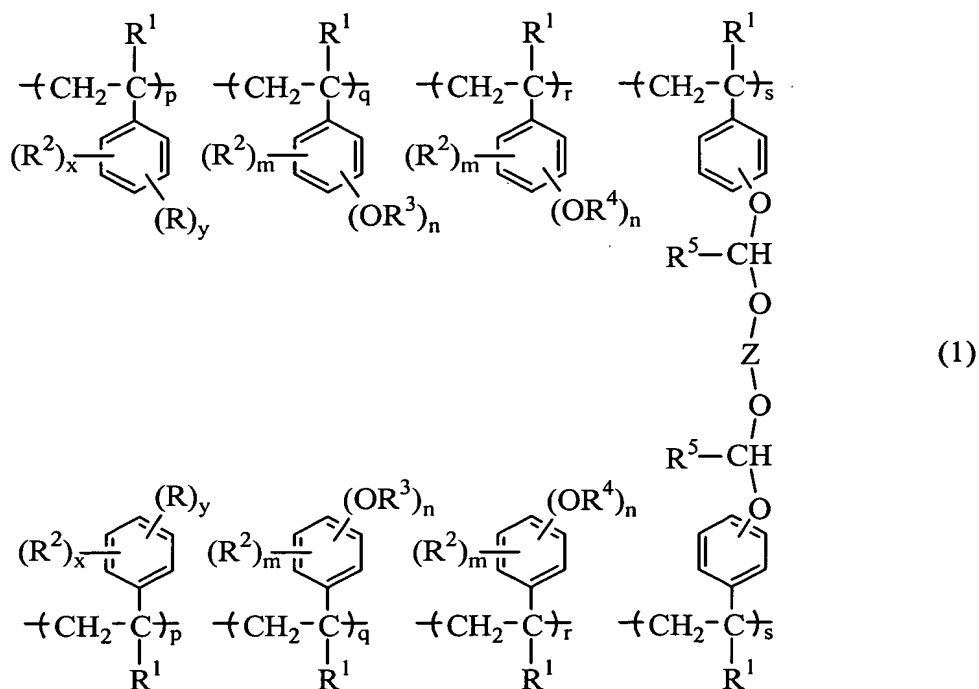
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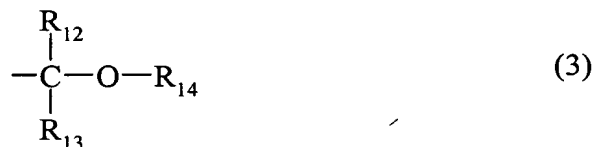
Amend claims 1, 5, 9 and 13 to read as follows (a marked up version of the amended claims is in an appendix attached hereto):

1. **(Twice Amended)** A chemical amplification type resist composition comprising a polymeric mixture of a polymer comprising recurring units of the general formula (1) and having a weight average molecular weight of 1,000 to 500,000 and a polymer comprising recurring units of the general formula (2) and having a weight average molecular weight of



1,000 to 500,000,

wherein R is a hydroxyl group or a OR<sup>3</sup> group, R<sup>1</sup> is hydrogen or methyl, R<sup>2</sup> is a straight, branched or cyclic alkyl group of 1 to 8 carbon atoms, R<sup>3</sup> is a group of the following formula  
(3)

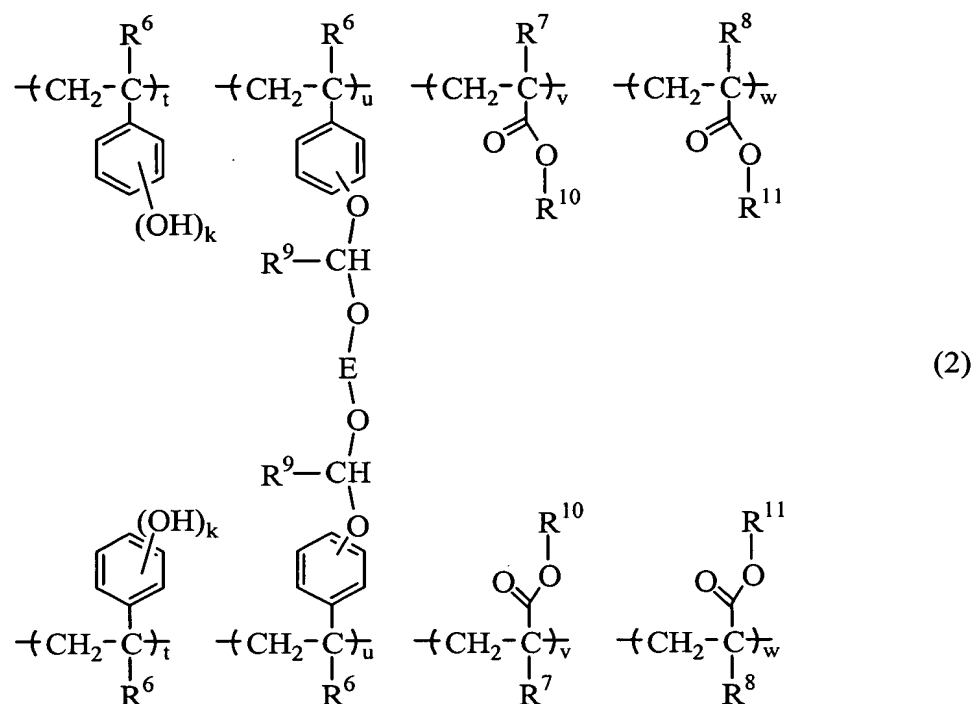


wherein, R<sup>12</sup> and R<sup>13</sup> are independently hydrogen or straight, branched or cyclic alkyl groups of 1 to 18 carbon atoms,

R<sup>14</sup> is a monovalent hydrocarbon group of 1 to 18 carbon atoms which optionally has a hetero atom and optionally has one or more hydrogen atoms replaced by hydroxyl, alkoxy, oxo, amino or alkylamino groups,

alternatively, a pair of R<sup>12</sup> and R<sup>13</sup>, a pair of R<sup>12</sup> and R<sup>14</sup>, or a pair of R<sup>13</sup> and R<sup>14</sup>, taken together, form a ring in which the pair together is a straight or branched alkylene group of 1 to 18 carbon atoms,

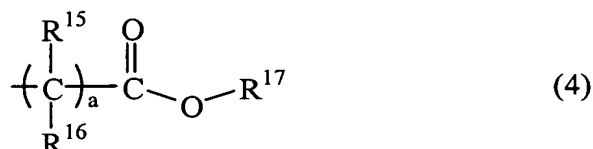
and R<sup>4</sup> each are is an acid labile group, R<sup>5</sup> is methyl or ethyl, Z is a straight, branched or cyclic alkylene group of 1 to 10 carbon atoms, x is 0 or a positive integer, y is a positive integer, satisfying x+y ≤ 5, m is 0 or a positive integer, n is a positive integer, satisfying m+n ≤ 5, q is a positive number, p, q, r and s each are 0 or a positive number, satisfying p+q+r+s = 1, provided that q and r are not both 0,



wherein  $\text{R}^6$ ,  $\text{R}^7$  and  $\text{R}^8$  each are hydrogen or methyl,  $\text{R}^9$  is methyl or ethyl, E is a straight, branched or cyclic alkylene group of 1 to 10 carbon atoms,  $\text{R}^{10}$  is a straight, branched or cyclic alkyl group of 1 to 20 carbon atoms, which may contain an oxygen or sulfur atom,  $\text{R}^{11}$  is a tertiary alkyl group of 1 to 20 carbon atoms, k is 0 or a positive integer of up to 5, t and w each are a positive number, u and v each are 0 or a positive number, either one of u and v is not equal to 0, satisfying  $t+u+v+w = 1$ .

5. (Amended) The composition of claim 1, wherein in formula (1), the acid labile groups  $\text{R}^3$  and group  $\text{R}^4$  are independently is selected from the group consisting of:

branched or cyclic, tertiary alkyl groups with 4 to 20 carbon atoms;  
trialkylsilyl groups whose alkyl groups each have 1 to 6 carbon atoms;  
oxoalkyl groups of 4 to 20 carbon atoms; and,  
groups of the following formulae (3) and (4):



wherein,

$\text{R}^{12}$  and  $\text{R}^{13}$  are independently hydrogen or straight, branched or cyclic alkyl groups of 1 to 18 carbon atoms,

$\text{R}^{14}$  is a monovalent hydrocarbon group of 1 to 18 carbon atoms, which may have a hetero atom and in which some hydrogen atoms are replaced by hydroxyl, alkoxy, oxo, amino or alkylamino groups,

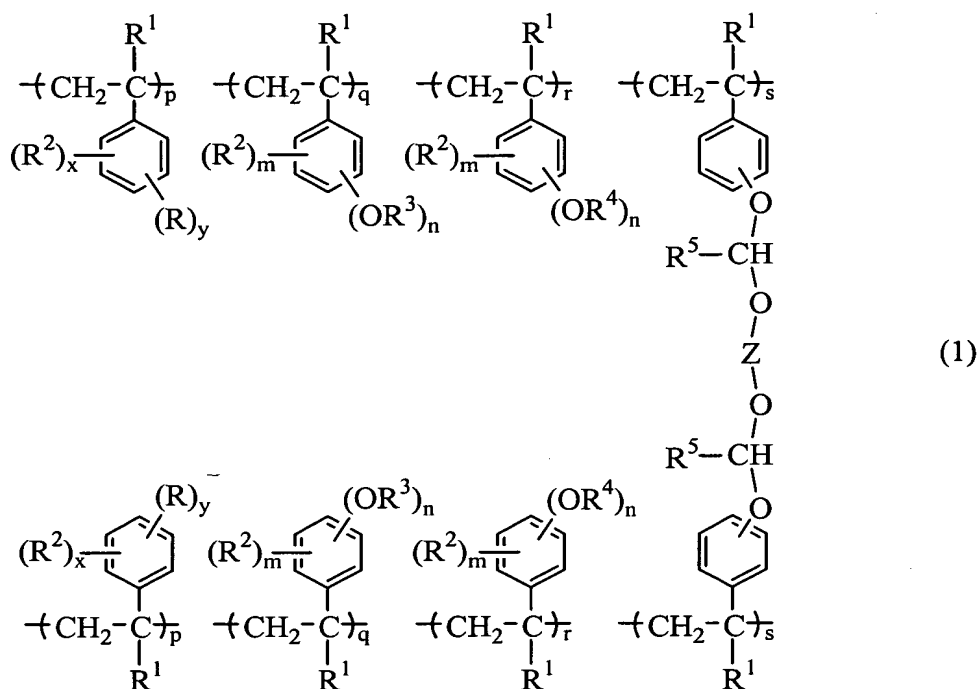
alternatively, a pair of  $\text{R}^{12}$  and  $\text{R}^{13}$ , a pair of  $\text{R}^{12}$  and  $\text{R}^{14}$ , or a pair of  $\text{R}^{13}$  and  $\text{R}^{14}$ , taken together, may form a ring, in which the pair is a straight or branched alkylene group of 1 to 18 carbon atoms.

$\text{R}^{15}$  and  $\text{R}^{16}$  independently have the same definition as  $\text{R}^{12}$  and  $\text{R}^{13}$ , and

$\text{R}^{17}$  is a straight, branched or cyclic alkyl group of 4 to 40 carbon atoms, a trialkylsilyl group whose alkyl groups each have 1 to 6 carbon atoms, or oxoalkyl group of 4 to 20 carbon atoms, and

the letter a is an integer of 0 to 6.

9. (Amended) A chemical amplification type resist composition comprising a polymeric mixture of a polymer comprising recurring units of the general formula (1) and having a weight average molecular weight of 1,000 to 500,000 and a polymer comprising recurring units of the general formula (2) and having a weight average molecular weight of 1,000 to 500,000,



wherein R is a hydroxyl group or a OR<sup>3</sup> group, R<sup>1</sup> is hydrogen or methyl, R<sup>2</sup> is a straight, branched or cyclic alkyl group of 1 to 8 carbon atoms, R<sup>3</sup> is a group of the following formula (3)



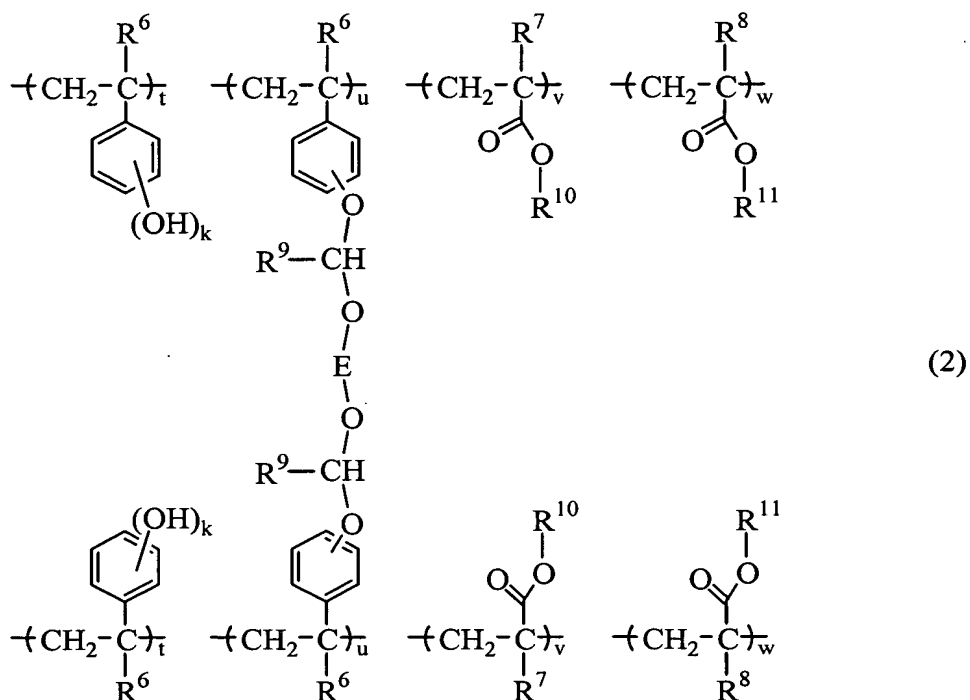
wherein, R<sup>12</sup> and R<sup>13</sup> are independently hydrogen or straight, branched or cyclic alkyl groups of 1 to 18 carbon atoms,



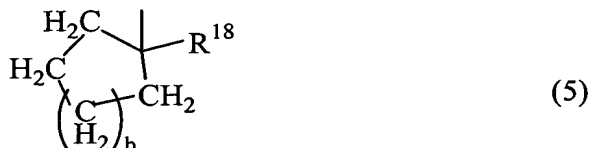
$R^{14}$  is a monovalent hydrocarbon group of 1 to 18 carbon atoms which optionally has a hetero atom and optionally has one or more hydrogen atoms replaced by hydroxyl, alkoxy, oxo, amino or alkylamino groups,

alternatively, a pair of  $R^{12}$  and  $R^{13}$ , a pair of  $R^{12}$  and  $R^{14}$ , or a pair of  $R^{13}$  and  $R^{14}$ , taken together, form a ring in which the pair together is a straight or branched alkylene group of 1 to 18 carbon atoms,

and  $R^4$  each are is an acid labile group,  $R^5$  is methyl or ethyl, Z is a straight, branched or cyclic alkylene group of 1 to 10 carbon atoms, x is 0 or a positive integer, y is a positive integer, satisfying  $x+y \leq 5$ , m is 0 or a positive integer, n is a positive integer, satisfying  $m+n \leq 5$ , q is a positive number, p, q, r and s each are 0 or a positive number, satisfying  $p+q+r+s = 1$ , provided that q and r are not both 0,



wherein  $R^6$ ,  $R^7$  and  $R^8$  each are hydrogen or methyl,  $R^9$  is methyl or ethyl, E is a straight, branched or cyclic alkylene group of 1 to 10 carbon atoms,  $R^{10}$  is a straight, branched or cyclic alkyl group of 1 to 20 carbon atoms, which may contain an oxygen or sulfur atom,  $R^{11}$  is a tertiary alkyl group selected from a group of the formulae (5) or (6):



wherein,  $R^{18}$  is a methyl, ethyl, isopropyl, cyclohexyl, cyclopentyl, vinyl, acetyl, phenyl or cyano group, and b is an integer of 0 to 3, and



wherein,  $R^{19}$  is an isopropyl, cyclohexyl, cyclopentyl, vinyl, acetyl, phenyl or cyano group, and

k is 0 or a positive integer of up to 5, t and w each are a positive number, u and v each are 0 or a positive number, either one of u and v is not equal to 0, satisfying  $t+u+v+w = 1$ .

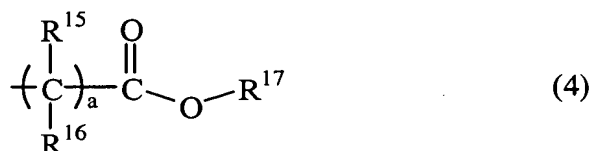
**13. (Amended)** The composition of claim 9, wherein in formula (1), the acid labile groups  $R^3$  and group  $R^4$  are independently is selected from the group consisting of:

branched or cyclic, tertiary alkyl groups with 4 to 20 carbon atoms;

trialkylsilyl groups whose alkyl groups each have 1 to 6 carbon atoms;

oxoalkyl groups of 4 to 20 carbon atoms; and,

groups of the following formulae (3) and (4):



wherein,

$\text{R}^{12}$  and  $\text{R}^{13}$  are independently hydrogen or straight, branched or cyclic alkyl groups of 1 to 18 carbon atoms,

$\text{R}^{14}$  is a monovalent hydrocarbon group of 1 to 18 carbon atoms, which may have a hetero atom and in which some hydrogen atoms are replaced by hydroxyl, alkoxy, oxo, amino or alkylamino groups,

alternatively, a pair of  $\text{R}^{12}$  and  $\text{R}^{13}$ , a pair of  $\text{R}^{12}$  and  $\text{R}^{14}$ , or a pair of  $\text{R}^{13}$  and  $\text{R}^{14}$ , taken together, may form a ring, in which the pair is a straight or branched alkylene group of 1 to 18 carbon atoms,

$\text{R}^{15}$  and  $\text{R}^{16}$  independently have the same definition as  $\text{R}^{12}$  and  $\text{R}^{13}$ , and

$\text{R}^{17}$  is a straight, branched or cyclic alkyl group of 4 to 40 carbon atoms, a trialkylsilyl group whose alkyl groups each have 1 to 6 carbon atoms, or oxoalkyl group of 4 to 20 carbon atoms, and

the letter a is an integer of 0 to 6.